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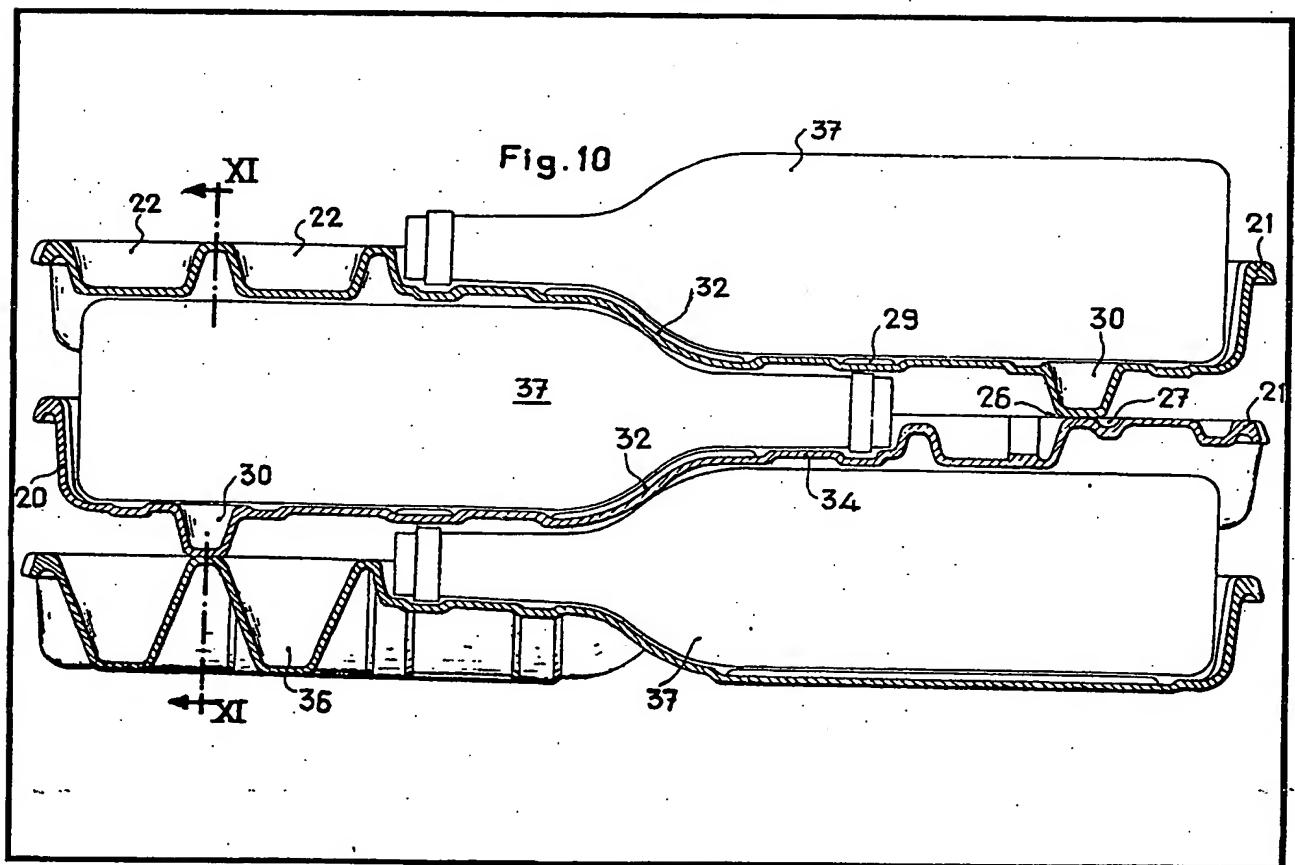
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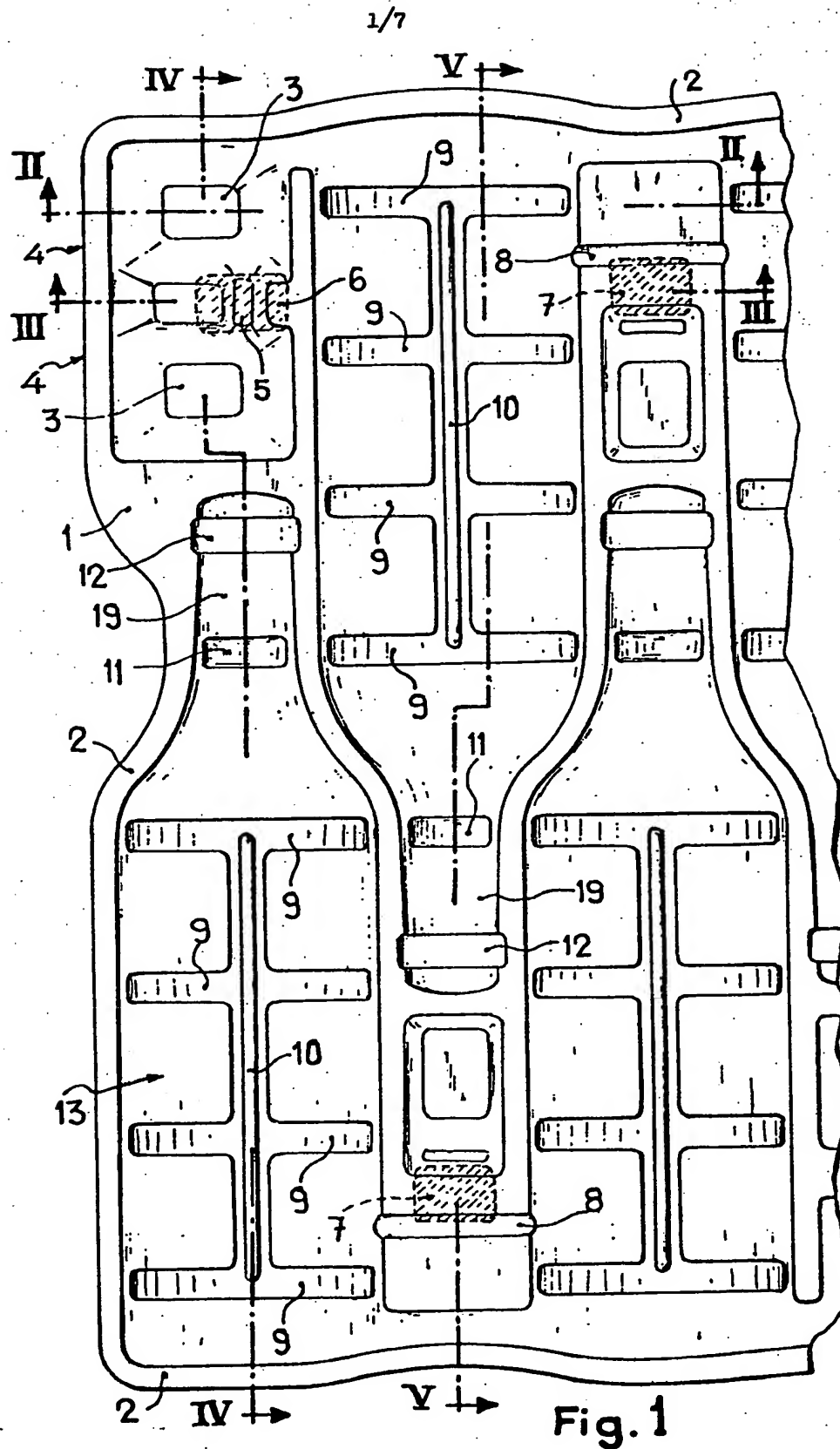
(54) Moulded trays

(57) A tray assembly, preferably moulded from a cellulose material, for storing bottles (37) comprises a base tray on which one or more stacking trays may be placed one on top of the other. Each tray is moulded in one-piece and has formed therein in staggered parallel rows, depressions to receive and locate the bottles (37). Each tray includes a peripheral reinforcing rib (21) and moulded-in reinforcements

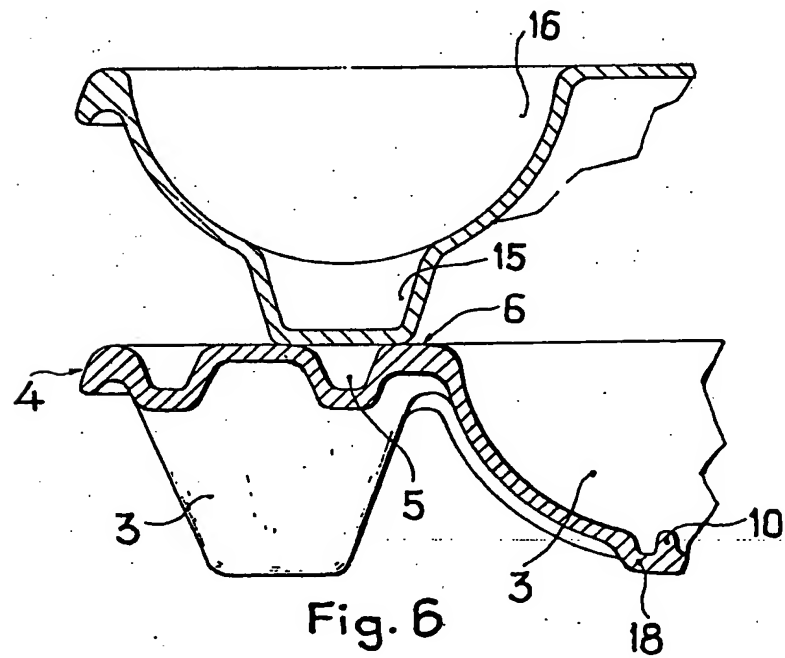
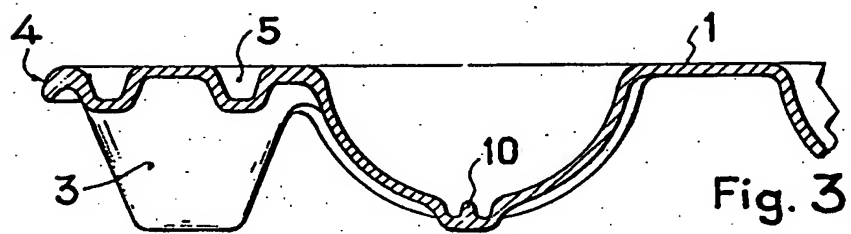
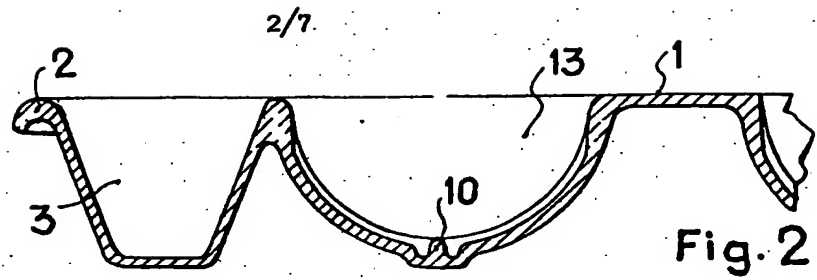
and the stacking trays have projecting feet (22, 30) by means of which one tray may be stacked on top of another, the construction of the trays being such that the weight of the bottles in a stack is transmitted through the stack via the bottles themselves as well as via the trays. The bare tray has feet (36) only at positions spaced from the positions of respective bottles (37) to allow the stack to stand on a flat surface.

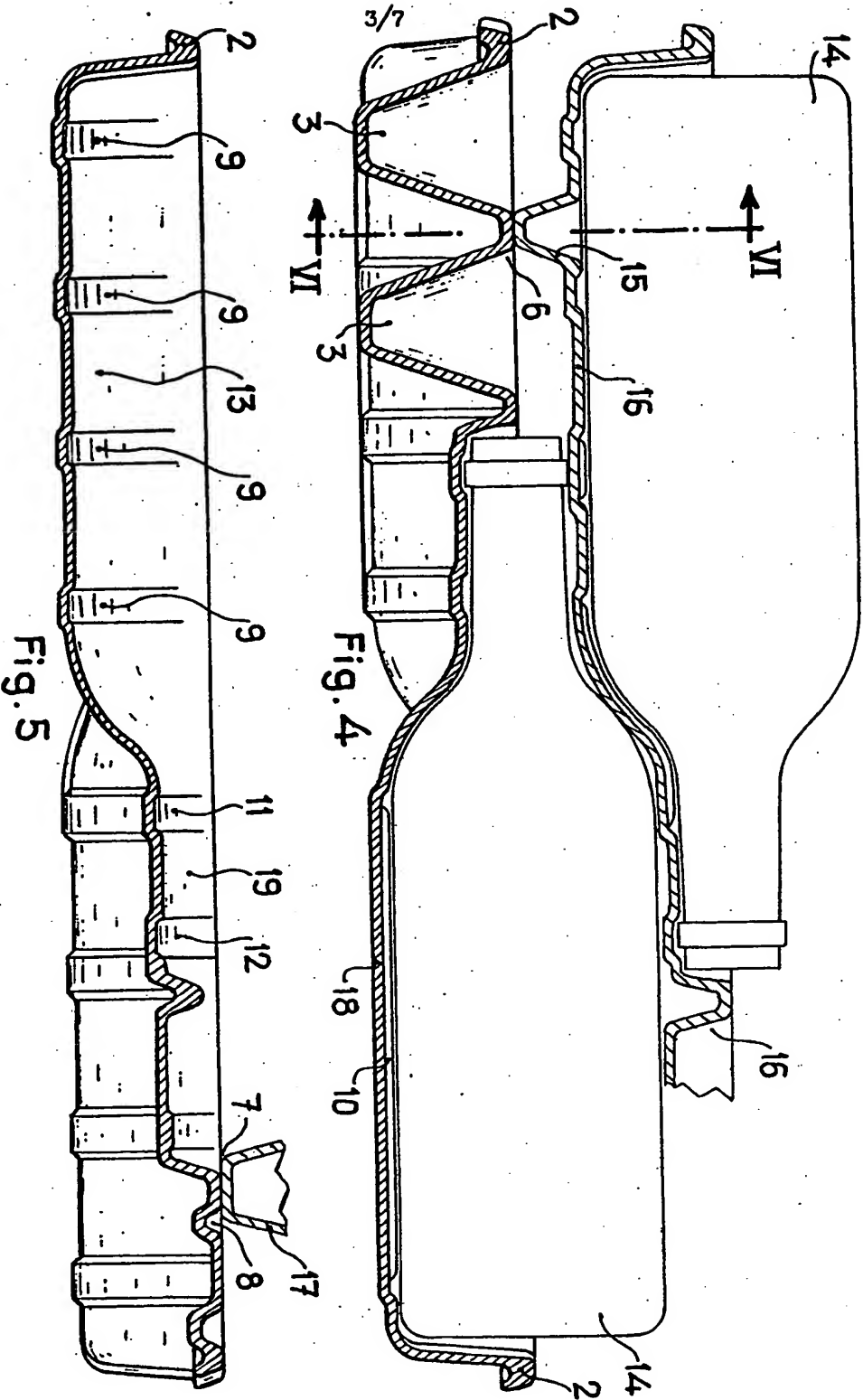


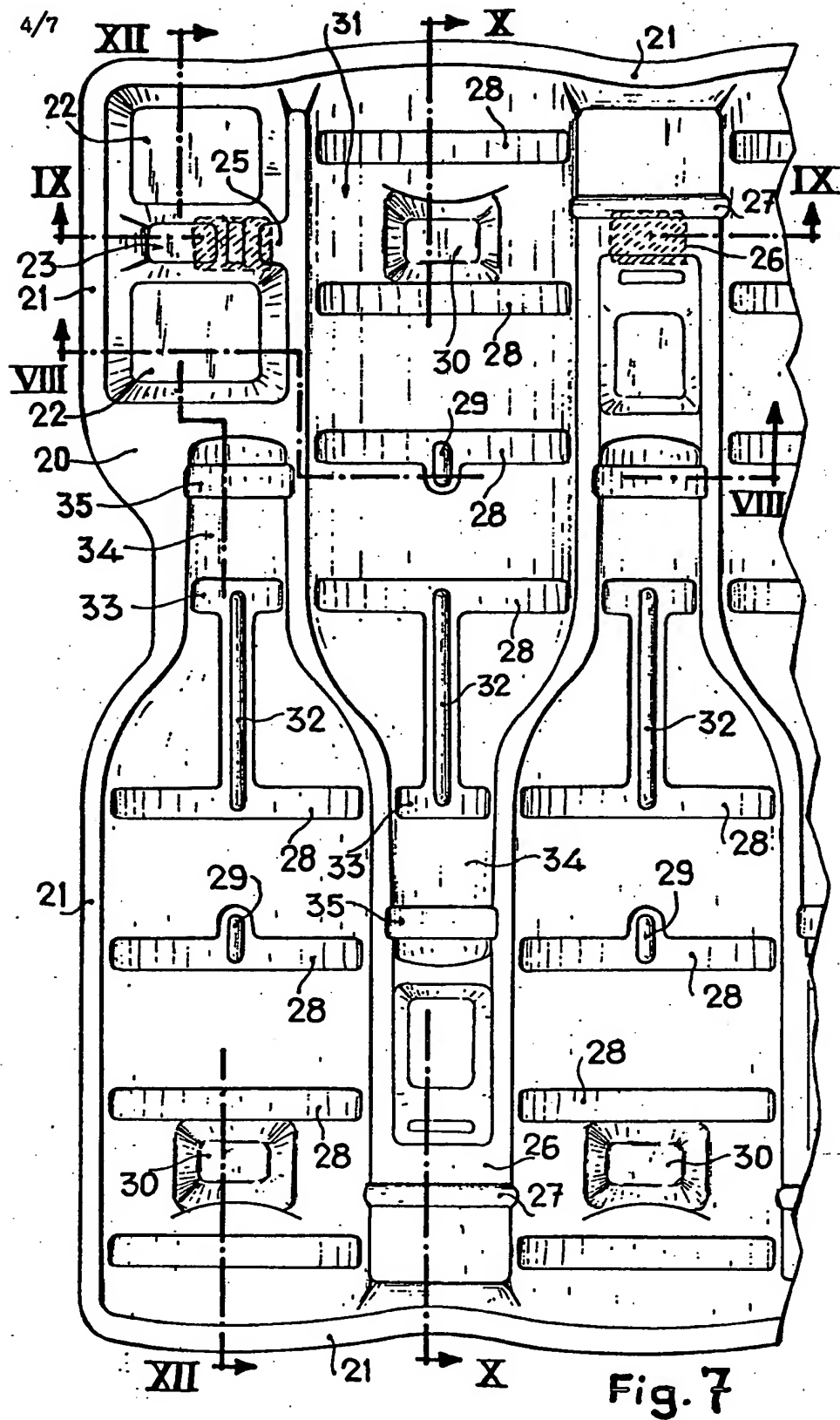
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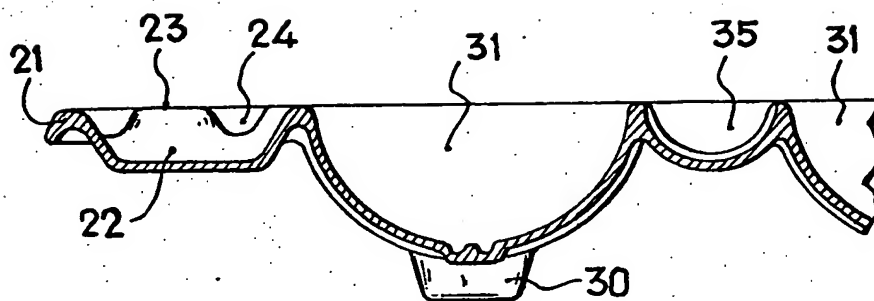


Fig. 8

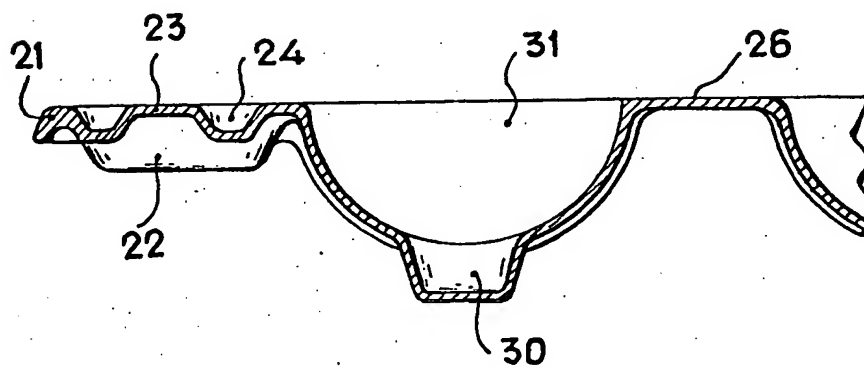
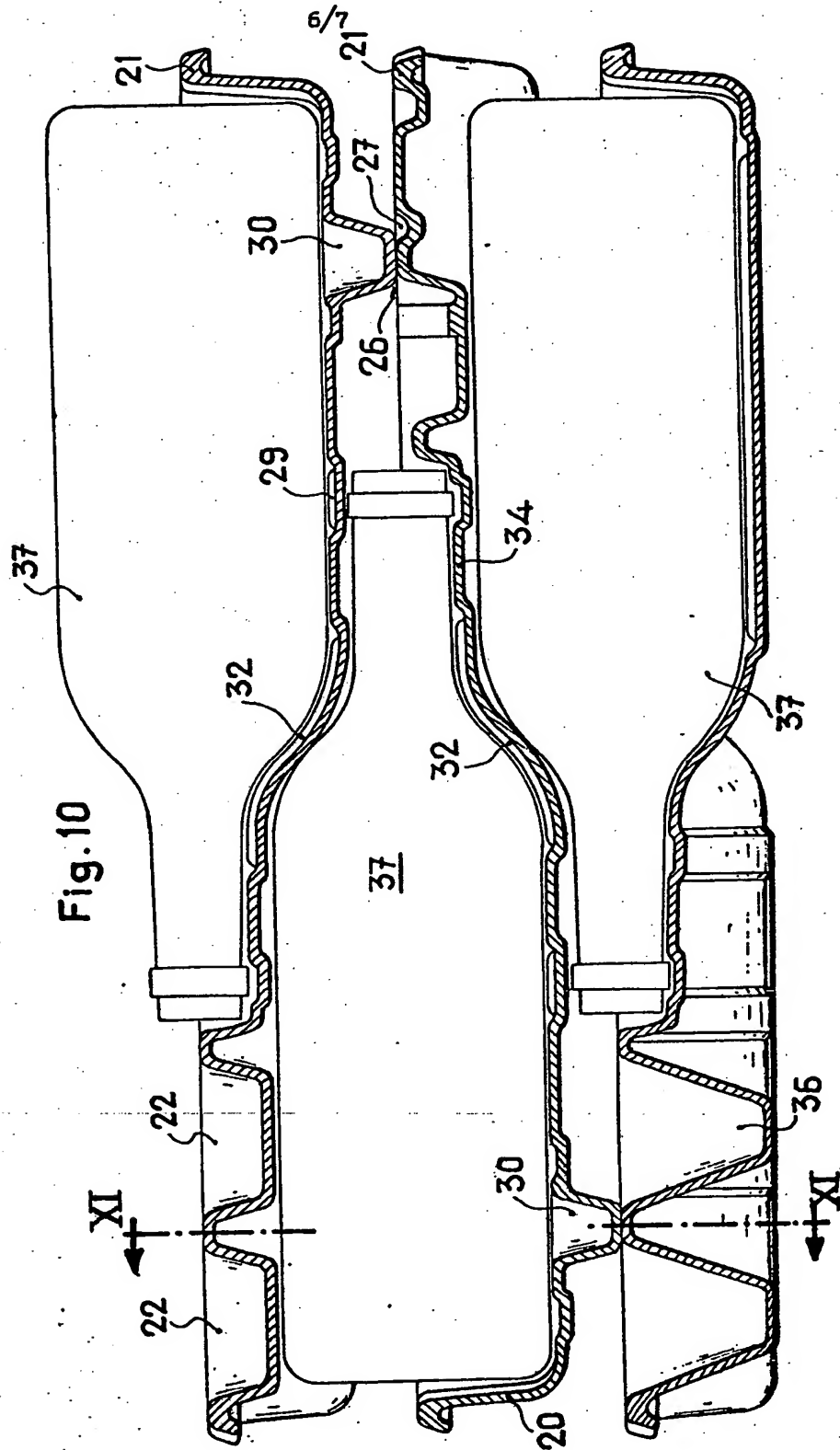


Fig. 9



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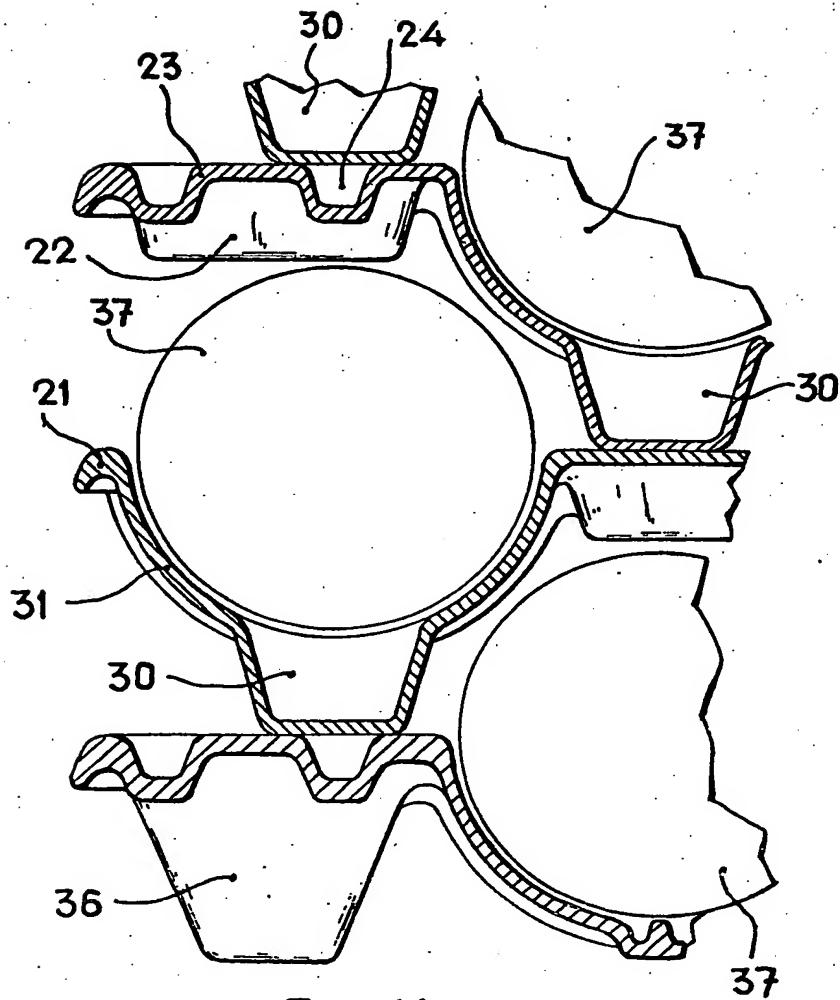


Fig. 11



## SPECIFICATION

### Trays for conditioning and holding bottle

- 5 This invention relates to trays, made preferably but not exclusively of a moulded cellulose material, on which several bottles may be arranged in staggered parallel rows. The trays of the invention have been specifically designed to contain bottles of certain types, such as the so-called "Bordeaux", "HOM-BROS ALTOS" or "SHERRY".

- When such bottles are placed in these trays, the space they occupy is considerably reduced over prior art trays and furthermore, a series of reinforcements are provided in the trays which, not only reduce the overall volume of the packaging formed from a plurality of stacked trays, but also enable packaging to be provided which is very safe both for storage and during transport.

Trays of the prior art only fulfill the function of acting as simple conditioning trays.

- The trays proposed herein, apart from permitting conditioning of the bottles stored therein, also withstand the weight of one tray directly on an adjacent one and, consequently, the weight of the bottles of one tray on the other is transmitted through both the actual bottle and the tray itself.

- The invention provides a tray for conditioning and holding bottles, which includes a first base tray, preferably moulded from a cellulose material on which a series of bottles may be arranged for conditioning in staggered parallel rows, the tray having a series of reinforcements which reduce the overall volume of a stack of trays and enable a safe packaging tray assembly to be formed both for storage and transport, said reinforcements permitting the weight of one tray over another lower one to be transmitted both through the actual bottles and through the tray itself, a peripheral projection being provided between said reinforcements which reaches the support surface of the tray, to improve its stability and resistance to deformation.

- Preferably, at least in the corners, and also in the inner areas of the said base tray, there are projections formed by two twin protrusions, between which there is a rib which constitutes the support for the tray placed immediately above and also at least one recess through which a broken profile is obtained which ensures a high resistance to side pressures applied to the tray.

- Conveniently, each of the cavities in which each bottle is housed, has at least one central longitudinal rib, on which, resting in the direction of its generatrix, the body of the respective bottle rests, and which rib limits the damping effect, without causing the total measurement of the encasing box to give way too much.

- In a preferred embodiment, in an orthogo-

nal direction to the central longitudinal rib, there are a series of furrows or transversal depressions which provide relative padding for the bottles, combining their action with that of the said longitudinal rib, to provide great housing stability.

- In addition to the base tray, the invention also provides a stacking tray to be used for piling trays on a base tray and on top of each other, said stacking tray preferably having a reinforcement rim in its contour, which serves as support for the projection provided for this purpose on a tray placed at the top, some or all of the corners of the stacking and the lower areas, having a support rib to receive the homologous projection of the upper tray, said rib, through the presence of at least one adjacent groove, being fully reinforced and thereby offering great compressive strength and also strength against pressures caused by possible side crushing.

- In a preferred stacking tray, on both sides of the support rib, at least two cavities are provided which are adapted to rest directly on the body of a bottle in the lower tray thereby enabling complete transmission of pressures between the bottle themselves and also through the trays so that the assembly of the latter constitutes a real support.

- Preferably, the bodies of the respective trays resting on at least one lower seat, which serves to limit the damping effect and avoid crushing the material in the area concerned, also has parallel longitudinal ribs with the former, the bottles resting on said shoulders, whereby an area of maximum reinforcement is achieved in the weakest area of the bottles.

- In another embodiment, there is provided a base tray for holding bottles comprising a body having an upper surface in which linearly arranged bottle shaped cavities are moulded, each cavity being reversed with respect to an adjacent cavity, the cavities closely interfitting with each other but leaving a space between the body edge and the part of each cavity adapted to receive a bottle neck to provide a support area on the upper surface of the body, two downwardly projecting but upwardly open hollow protrusions extending from the upper surface of the body in said support area in at least one corner of the tray, said protrusions being separated by a support rib whose upper surface is coplanar with the remainder of the upper surface of the tray and the bottom of said protrusions being coplanar with the bottom of the bottle receiving cavities.

- In yet another embodiment, there is provided a stacking tray for holding bottles comprising a body having an upper surface in which linearly arranged bottle shaped cavities are moulded, each cavity being reversed with respect to an adjacent cavity, the cavities closely interfitting with each other but leaving a space between the body edge and the part

of each cavity adapted to receive a bottle neck to provide a support area on the upper surface of the body, two downwardly projecting but upwardly open protrusions extending from the upper surface of the body in said support area in at least one corner of the tray, said protrusions being separated by a support rib whose upper surface is coplanar with the remainder of the upper surface of the tray, a downwardly extending foot being formed in each bottle receiving cavity adjacent its end remote from its neck receiving portion, the bottom of said foot projecting beyond the bottom of the bottle receiving cavity, whereas the bottom of each protrusion does not extend downwardly as far as the bottom of the bottle receiving cavities.

In the trays of the invention, all the reinforcement elements are directed in their design towards achieving this transmission and reinforcement support.

In use, a base tray is first placed on the ground and a first series of bottles are then laid in it. One or more stacking trays are then placed on top of the base tray to hold further bottles, the assembled stack forming a tray assembly.

Other features and advantages of the invention will become clear from the following description of a preferred embodiment, by way of example only, with reference to the accompanying drawings, in which:—

*Figure 1*, a plan view of part of a base tray showing areas 6 and 7 on which a tray such as that shown in Figs. 7 to 11 can rest,

*Figure 2* is a cross-section along the line II-II of Fig. 1,

*Figure 3* is a cross-section along the line III-III of Fig. 1,

*Figure 4* is a cross-section along the line IV-IV of Fig. 1 but including two bottles and showing two trays stacked on each other,

*Figure 5* is a cross-section along the line V-V in Fig. 1,

*Figure 6* is a cross-section of Fig. 4 along the line VI-VI in Fig. 1,

*Figure 7* is a plan view of a stacking tray assembly for stacking on top of the base tray of Figs. 1-6,

*Figure 8* is a cross-section along the line VIII-VIII of Fig. 7,

*Figure 9* is a cross-section along the line IX-IX of Fig. 7 and

*Figure 10* is a longitudinal section through a series of stacked trays, the tray 36 being a base tray in accordance with Fig. 1, and the remainder of the trays being stacking trays, the middle tray being sectioned along the line X-X in Fig. 7 and the top tray being a section along the line XII-XII in Fig. 7,

*Figure 11* is a cross-section along the line E-E in Fig. 10

Referring to the drawings, there is shown in Fig. 1 a base tray 1 having a peripheral rim or rib 2 which stiffens the tray assembly. In at

least one corner of the tray, two downwardly projecting feet 3 are provided which also serve to strengthen this stacking area of the tray by providing between them a support rib 6 to receive in stacking relationship thereon foot 15 of a tray 16 stacked thereon.

The bottoms of the feet 3 all being coplanar with each other and base 18 (see Fig. 6).

A reinforcement groove 5 is formed between the two juxtaposed feet 3 to support the side ribs 2 against lateral deformation in the direction of arrow 4, this groove 5 also serving to considerably strengthen the support area 6 as a whole. The groove 5 and the peripheral rib 2 are very important, as they strengthen the corners of the tray, providing it with sufficient side stiffness to withstand the lateral pressures in the direction of arrows 4, which usually arise on forming the packaging of the box and the following gluing.

As can be seen from Fig. 1, the major part of the tray includes bottle shaped depressions 13 formed therein in parallel rows and in reversed staggered relationship, a support area 7 being provided between each pair of depressions 13, to receive and support thereon a foot 15 of another tray 16 when stacked thereon (see Fig. 6); a reinforcing groove or rib 8 being provided immediately adjacent said area 7.

Each bottle shaped depression 13 includes channels or ribs 9, conveniently semi-circular in shape, which serve to protect and pad the body of a bottle in the depression 13. An axially extending rib 10 is also provided in each depression 13 which projects from the bottom 18 thereof, the rib 10 limiting the damping effect and also serving to avoid crushing of a bottle located therein. A semi-circular rib or groove 11 strengthens the housing of the neck of the bottle while groove 12 is shaped to receive the neck of an actual bottle 14.

Trays 16 to be described in more detail hereafter with reference to Figs. 7-11 also have feet 15 projecting therefrom which support the tray on the base tray 1 in stacking relationship therewith on area 6, a foot 17 also resting at 7 on the base tray (see Fig. 5).

A depression 19 in the tray 1 provides a housing to receive the bottle neck.

By means of the feet 3 extending from the base tray 1 to the support surface on which the tray assembly is to rest, the tray assembly is quite stable and, when another tray is stacked thereon with its feet resting on area 6, crushing is avoided. Consequently, the possibility of collapse of the stacked pile of trays forming the tray assembly is avoided.

This arrangement can be seen in Fig. 1 and will be that most suitable in the corners of the tray in the part thereof opposite the bottle neck.

The longitudinal rib 10 on which rests the body of a bottle housed in the depression 13

is also very important as it prevents crushing and, by serving as a set for the generatrix of the bottle, limits the damping effect without giving way more than the total measurement of the encasing box. The body of the bottle also rests on a padded bed, formed by the grooves 9 so through the combination of the padded grooves 9 and the limiting rib 10, it will be appreciated that the bottles are firmly located in their housings.

From the foregoing description, it will be seen that the invention provides a base tray 1 on which another stacking tray such as that represented in Figs. 7 to 11 can be placed the feet of said stacking tray resting on the areas 6 and 7 shown in broken lines and shaded in Fig. 1, the base tray having a combination of reinforcements which, apart from making it stable, also efficiently hold the bottles.

This set of reinforcements is as follows:

The edge reinforcement 2 extending throughout the whole of the periphery of the tray; the semi-circular ribs 9 tangentially co-operating with the bottles and forming a buffer for the body thereof; the bottom rib 10 which avoids crushing of the bottle body and the housing 19 for the bottle neck.

As already indicated, Figs. 7-11 show a different form of tray, hereinafter referred to as a stacking tray, conveniently obtained from moulded cellulose, which is designed to be stacked on top of a base tray 1.

This stacking tray has a peripheral reinforcing rim 21 and a rib 23 which serves as a support for the projection existing in the base tray 1 on which it has to be placed. This rib 23, is well reinforced by means of groove 22 and in this way not only provides the unit with compressive strength, but also against pressure resulting from side crushing.

Depressions or feet 22 in both sides of the support rib 23, are adapted to rest directly on the body of a bottle 18 which is located in a base tray 1 (see Fig. 10). In this way, there is a complete transmission of pressures as explained hereinbelow:

The body of the bottles 37 actually transmits the load in combination with the trays themselves resting one on top of the other.

Thus, the tray units, apart from permitting conditioning of the bottles therein, also act as genuine supports for the tray assembly.

In the illustrated tray, an important support point is obtained for the body of the bottles, through a lower seat which serves to limit the damping effect, avoiding the material crushing in that area, there also being longitudinal ribs on which the shoulders of the bottles rest.

Normally, any side movement of the bottles could cause breakages as these movements would result in an impact at the weakest area of the bottle. However, in the illustrated tray, ribs 28 protect the shoulders of the bottle to obviate this problem. Thus, maximum protection and reinforcement against impact, is

achieved in the tray for the weakest part of the bottle.

Referring now in more detail to Figs. 7-11, there is shown a stacking tray 20 having a peripheral reinforcing rib 21.

Reinforcing feet or cavities 22 which are shaped and positioned to rest on the body of a bottle 37 located beneath them (see Fig. 10) are provided, rib 23 between said cavities itself being reinforced by a reinforcement groove 24, which ensures that the rib 23 offers adequate resistance to side pressures in much the same way as the arrangement used in the base tray 1 of Figs. 1-6. Areas 25 and 26 provide the support part for areas 30 of a tray stacked thereon.

A transverse rib/groove 27 serves to give strength to the support area 26 and semi-circular support grooves 28 likewise for the body of the bottles. A support rib 29 prevents crushing of each bottle, outwardly projecting feet extending from part 31 of the tray which houses the body of a bottle (see Figs. 8 and 9).

Each bottle housing also includes a rib 32 to support the shoulder of a bottle, a rest ring 33 for the start of the bottle neck, and a housing 34 for the bottle neck itself. The top part of the bottle neck is supported in a housing part 35.

Figs. 10 and 11 show the manner in which a tray assembly may be formed using a base tray 36 of the type shown in Figs. 1 to 6 on which a plurality of stacking trays are stacked, the bottle receiving housings in each tray being filled with bottles 37.

#### CLAIMS (18 Apr 1980)

1. A tray for conditioning and holding bottles, which includes a first base tray, preferably moulded from a cellulose material on which a series of bottles may be arranged for conditioning staggered parallel rows, the tray having a series of reinforcements which reduce the overall volume of a stack of trays and enable a safe packaging tray assembly to be formed both for storage and transport, said reinforcements permitting the weight of one tray over another lower one to be transmitted both through the actual bottles and through the tray itself, a perimetral projection being provided between said re-inforcements the support surface which reaches the support surface of the tray, to improve its stability and resistance to deformation.

2. A tray as claims in Claim 1, wherein at least in the corners, and also in the inner areas of the said base tray, there are projections formed by two twin protrusions, between which there is a rib which constitutes the support for the tray placed immediately above and also at least one recess through which a broken profile is obtained which ensures a high resistance to side pressures applied to the tray.

3. A tray as claimed in Claim 1 or Claim 2, wherein each of the cavities in which each bottle is housed, has at least one central longitudinal rib, on which, resting in the direction of its generatrix, the body of the respective bottle rests, and which rib limits the damping effect, without causing the the total measurement of the encasing box to give way too much.

4. A tray as claimed in Claim 3, wherein, in an orthogonal direction to the central longitudinal rib, a series of furrows or transversal depressions are provided which provide relative padding for the bottles, combining their action with that of the said longitudinal rib, to provide great housing stability.

5. A stacking tray for stacking on a base tray according to any of Claims 1-4 having a reinforcement rim in its contour, which serves as support for the projection provided for this purpose on a tray placed at the top, some or all of the corners of the stacking and the lower areas, having a support rib to receive the homologous projection of the upper tray, said rib, through the presence of at least one adjacent groove, being fully reinforced and thereby offering great compressive strength and also strength against pressures caused by possible side crushing.

6. A tray as claimed in Claim 5, wherein on both sides of the support rib, at least two cavities are provided which are adapted to rest directly on the body of a bottle in the lower tray thereby enabling a complete transmission of pressures between the bottles themselves and also through the trays, so that the assembly of the latter constitutes a real support.

7. A tray as claimed in Claim 5 or Claim 6, wherein the bodies of the respective trays resting on at least one lower seat, which serves to limit the damping effect and avoid crushing the material in the area concerned, also has parallel longitudinal ribs with the former, the bottles resting on said shoulders, wherein an area of maximum reinforcement is achieved in the weakest area of the bottles.

8. A one-piece base tray for holding bottles comprising a body having an upper surface in which linearly arranged bottle shaped cavities are moulded, each cavity being reversed with respect to an adjacent cavity, the cavities closely interfitting with each other but leaving a space between the body edge and the part of each cavity adapted to receive a bottle neck to provide a support area on the upper surface of the body, two downwardly projecting but upwardly open hollow protrusions extending from the upper surface of the body in said support area in at least one corner of the tray, said protrusions being separated by a support rib whose upper surface is coplanar with the remainder of the upper surface of the tray and the bottom of said protrusions being coplanar with the bot-

tom of the bottle receiving cavities.

9. A tray as claimed in Claim 8, wherein said two hollow protrusions are provided at two corners of the tray.

10. A tray as claimed in Claim 8 or Claim 9, wherein the rib separating the two hollow protrusions has at least one strengthening recess therein to provide the rib with a broken profile.

11. A tray as claimed in any of Claims 8 to 10, wherein at least one central axially extending rib is provided in each bottle receiving cavity to support thereon the body portion of a bottle housed in the cavity.

12. A tray as claimed in Claim 11, wherein a plurality of laterally extending ribs are provided in each bottle receiving cavity to support thereon the body portion of a bottle housed in the cavity.

13. A tray as claimed in any of Claims 8 to 12, wherein, except in the corner or corners provided with the two hollow protrusions, a cavity is provided in each support area on the upper surface of the body.

14. A tray as claimed in Claim 13, wherein a strengthening rib is provided between said cavity and the edge of the tray.

15. A tray as claimed in any of the preceding Claims, wherein a strengthening rib is provided around the whole of the periphery of the tray.

16. A tray substantially as hereindescribed with reference to any of Figs. 1 to 6 of the accompanying drawings.

17. A one-piece stacking tray for holding bottles comprising a body having an upper surface in which linearly arranged bottle shaped cavities are moulded, each cavity being reversed with respect to an adjacent cavity, the cavities closely interfitting with each other but leaving a space between the body edge and the part of each cavity adapted to receive a bottle neck to provide a support area on the upper surface of the body, two downwardly projecting but upwardly open protrusions extending from the upper surface of the body in said support area in at least one corner of the tray, said protrusions being separated by a support rib whose upper surface is coplanar with the remainder of the upper surface of the tray, a downwardly extending foot being formed in each bottle receiving cavity adjacent its end remote from its neck receiving portion, the bottom of said foot projecting beyond the bottom of the bottle receiving cavity, whereas the bottom of each protrusion does not extend downwardly as far as the bottom of the bottle receiving cavities.

18. A tray as claimed in Claim 17; wherein said two hollow protrusions are provided in two corners of the tray.

19. A tray as claimed in Claim 18, wherein the rib separating the two hollow protrusions has at least one strengthening recess therein to provide the rib with a broken

profile.

20. A tray as claimed in any of Claims 17 to 19, wherein a longitudinal axially extending rib is provided in each bottle receiving cavity in the portion thereof which receives the bottle shoulder.

21. A tray as claimed in any of Claims 17 to 20, wherein laterally extending parallel ribs are provided in each bottle receiving cavity to support the body of a bottle thereon.

22. A tray as claimed in any of Claims 17 to 21, wherein, except in the corner or corners provided with the two hollow protrusions, a cavity is provided in each support area on the upper surface of the body.

23. A tray as claimed in Claim 22, wherein a strengthening rib is provided between said cavity and the edge of the tray.

24. A tray as claimed in any of Claims 17 to 23, wherein a strengthening rib is provided around the whole of the periphery of the tray.

25. A stacking tray substantially as herein-described with reference to any of Figs. 7-11 of the accompanying drawings.

26. A tray assembly comprising a base tray as claimed in Claim 1 and at least one stacking tray arranged thereon substantially as herein-described with reference to Figs. 4 or 10 of the accompanying drawings.

#### CLAIMS (18 Jul 1980)

1. A tray for conditioning and holding bottles, which includes a first base tray, preferably moulded from a cellulose material on which a series of bottles may be arranged for conditioning in staggered parallel rows, the tray having a series of reinforcements which reduce the overall volume of a stack of trays and enable a safe packaging tray assembly to be formed both for storage and transport, said reinforcements permitting the weight of one tray over another lower one to be transmitted both through the actual bottle and through the tray itself, a perimetral projection being provided between said reinforcements which reaches the support surface of the tray, to improve its stability and resistance to deformation.

5. A stacking tray for stacking on a base tray according to any of Claims 1-4 having a reinforcement rim in its contour, which serves as support for the projection provided for this purpose on a tray placed at the top, some or all of the corners of the stacking tray and the lower areas, having a support rib to receive the homologous projection of the upper tray, said rib, through the presence of at least one adjacent groove, being fully reinforced and thereby offering great compressive strength and also strength against pressures caused by possible side crushing.